Human Factors Assessment of Environmental Technology

Developer: Operating Engineers National HAZMAT Program
Contract Number: DE-FC21-95MC32260
Crosscutting Area: N/A

Technical Integration

Problem:

A report issued by the Office of Technology Assessment in 1995 stated that some twelve federal agencies had devoted about $3.5 billion to environmental technology development programs in FY 1994. Of significance, none of these technology development programs specifically considered the man-machine interface (human-factors) nor the unique safety and health hazard that might be posed by the specific technology to technology operators and maintenance personnel or to emergency responders. The approach to these issues within the Department of Energy (DOE) complex has been to field new technologies and then leave the matter of operational human factors and safety and health problem identification and resolution to the DOE and contractor field personnel. This usually results in delays and additional unanticipated costs.

In the broader perspective, any hazard or human-factors operational problem inherent in a technology requires that the technology user identify such hazards and problems, develop operational means to work safety and productively in the presence of such hazards, provide the appropriate training to the operators and maintenance personnel, develop management systems to assure that procedures are being followed, and pay workers compensation insurance premiums which reflect the risk associated with exposure to the hazards. The identification and elimination or mitigation of human-factors interface problems and safety and health hazards during the technology development continuum can substantially reduce the costs and burdens on the technology user.

Solution:

In recognition of the potential benefits, DOE entered into a Cooperative Agreement, "Human Factors Assessment of Environmental Technologies," with the International Union of Operating Engineers (IUOE) National HAZMAT Program. The Cooperative Agreement is unique and the first among several Federal Agencies with significant environmental technology development programs. The mission of the program is to conduct hands-on human factors assessments of innovative technologies; develop recommendations for technology improvements to achieve greater efficiency, productivity, and reduced physiological stress; and develop materials to promote and enhance acceptable human performance.

Benefits:

- Reduced costs to achieve operational status during initial technology deployment
- Increased efficiency of operation associated with reduced worker hazard exposure and physiologic stress
- Improved worker training through use of technology specific t raining modules including technology specific video methods
- Reduced incidence of worker injury and illness rates
- Establishment of validated performance standards for materials handling equipment utilized in the remediation sector as one basis for estimation of remediation task total costs
- Provides a unique perspective and baseline assessment without the delays associated with the conduct of safety-related evaluations during deployment to the DOE operational

setting

Technology:

The program includes a number of approaches to achieving its mission. These include the conduct of baseline human-performance utilizing the IUOE-validated heavy equipment performance standards with equipment operators wearing the four different levels of personal protective ensembles associated with hazardous waste operations. TYPE I Assessments focus on new individual worker protection technologies in a field setting performing standardized hazardous waste operations tasks including heavy equipment operations. TYPE II Assessments focus on conduct of established human factors and hazard assessment procedures for new remediation technologies in the field setting, and evaluation of technology specific emergency characteristics.

The products of the assessment program include new technology assessment reports, validated human factors and safety and health assessment protocols and procedures, development of Technology Safety Data Sheets and Emergency Response Data Sheets, and the development of technology-specific training modules appropriate for use by technology developers and users.

Contacts:

The International Union of Operating Engineers, through its National HAZMAT Program, Provides hands-on, human-factors-based, approaches for improved productivity and safety of skilled workers. For information regarding this project, the contractor contact is:

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DOE's Federal Energy Technology Center supports the Environmental Management - Office of Science and Technology by contracting the research and development of new technologies for waste site characterization and cleanup. For information regarding this project, the DOE contact is:

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